WHAT WE CLAIM IS

1. A noble metal nanotube, wherein the skeleton of noble metal nanotube is made of a single noble metal element of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), or iridium (Ir) as noble metal elements and wherein the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, 2-4 nm in inner diameter, about 1-2 nm in thickness, and 10 nm or more in length.

2. A noble metal nanotube, wherein the skeleton of the noble metal nanotube is made of an organization in which two or more selected from a group consisting of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) as noble metal elements are mixed in any proportions and wherein the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, about 2-4 nm in inner diameter, about 1-2 nm in thickness, and 10 nm or more in length.

3. A noble metal nanotube, wherein the skeleton of the noble metal nanotube is made of an organization in which one or more elements selected from a group consisting of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) and one or more elements selected from a group of base metals such as nickel (Ni) are mixed in any proportions and wherein the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, about 2-4 nm in inner diameter, about 1-2 nm in thickness, and

10 nm or more in length.

4. A producing method of a noble metal nanotube as claimed in claim 1, wherein the skeleton of the noble metal nanotube is made of a single noble metal element of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), or iridium (Ir) as noble metal elements and the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, about 2-4 nm in inner diameter, about 1-2 nm in thickness, and 10 nm or more in length, the method comprising preparing a reaction mixture of one metal salt or metal complex compound selected from a group of noble metal salts and noble metal complex compounds such as nitrate salts, chlorides, and metal oxides of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), and iridium (Ir) as noble metal elements; two kinds of nonionic surfactants or one kind of nonionic surfactant and one kind of ionic surfactant i.e. two kinds of surfactants selected from a group consisting of polyoxyethylene alkyl ethers such as nonaethylene glycol monohexadecyl ether, polyoxyethylene fatty acid esters, organic sodium sulfates such as sodium dodecyl sulfate and sodium dodecylbenzenesulfonat, alkylammonium salts such as hexadecyltrimethylammonium bromide, polyoxyethylene sorbitan ester such as polyoxyethylene sorbitan monostearate, polyoxyethylene alkyl phenyl ether, and polyoxyethylene polyoxypropylene block polymer; and water, or preparing a reaction mixture, in addition to the above reaction mixture,

containing both or either of acid such as nitric acid and alcohol such as dodecyl alcohol and, after that, adding reducing agent such as hydrazine into the reaction mixture or irradiating the reaction mixture with light to cause reaction so as to produce the noble metal nanotubue, and collecting the noble metal nanotube.

5. A producing method of a noble metal nanotube as claimed in claim 2, wherein the skeleton of the noble metal nanotube is made of an organization in which two or more selected from a group consisting of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) as noble metal elements and the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, about 2-4 nm in inner diameter, about 1-2 nm in thickness, and 10 nm or more in length, the method comprising preparing a reaction mixture of two or more metal salts or metal complex compounds selected from a group of noble metal salts and noble metal complex compounds such as nitrate salts, chlorides, and metal oxides of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) as noble metal elements; two kinds of nonionic surfactants or one kind of nonionic surfactant and one kind of ionic surfactant i.e. two kinds of surfactants selected from a group consisting of polyoxyethylene alkyl ethers such as nonaethylene glycol monohexadecyl ether, polyoxyethylene fatty acid esters, organic sodium sulfates such as sodium dodecyl sulfate

and sodium dodecylbenzenesulfonat, alkylammonium salts such as hexadecyltrimethylammonium bromide, polyoxyethylene sorbitan ester such as polyoxyethylene sorbitan monostearate, polyoxyethylene alkyl phenyl ether, and polyoxyethylene polyoxypropylene block polymer; and water, or preparing a reaction mixture, in addition to the above reaction mixture, containing both or either of acid such as nitric acid and alcohol such as dodecyl alcohol and, after that, adding reducing agent such as hydrazine into the reaction mixture or irradiating the reaction mixture with light to cause reaction so as to produce the noble metal nanotube, and collecting the noble metal nanotube.

6. A producing method of a noble metal nanotube as claimed in claim 3, wherein the skeleton of the noble metal nanotube is made of an organization in which one or more elements selected from a group consisting of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) and one or more elements selected from a group of base metals such as nickel (Ni) are mixed in any proportions and the noble metal nanotube has a tubular form of about 5-7 nm in outer diameter, about 2-4 nm in inner diameter, about 1-2 nm in thickness, and 10 nm or more in length, the method comprising preparing a reaction mixture of one or more metal salts or metal complex compounds selected from a group of noble metal salts and noble metal complex compounds such as nitrate salts, chlorides, and

metal oxides of gold (Au), silver (Ag), platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), and ruthenium (Ru) as noble metal elements; one or more base metal salts selected from a group of metal salts such as nitrate salts and chlorides of base metal elements such as nickel (Ni); two kinds of nonionic surfactants or one kind of nonionic surfactant and one kind of ionic surfactant i.e. two kinds of surfactants selected from a group consisting of polyoxyethylene alkyl ethers such as nonaethylene glycol monohexadecyl ether, polyoxyethylene fatty acid esters, organic sodium sulfates such as sodium dodecyl sulfate and sodium dodecylbenzenesulfonat, alkylammonium salts such as hexadecyltrimethylammonium bromide, polyoxyethylene sorbitan ester such as polyoxyethylene sorbitan monostearate, polyoxyethylene alkyl phenyl ether, and polyoxyethylene polyoxypropylene block polymer; and water, or preparing a reaction mixture, in addition to the above reaction mixture, containing both or either of acid such as nitric acid and alcohol such as dodecyl alcohol and, after that, adding reducing agent such as hydrazine into the reaction mixture or irradiating the reaction mixture with light to cause reaction so as to produce the noble metal nanotube, and collecting the noble metal nanotube.

7. A functional material containing one or more noble metal nanotube(s) as stated in claims 1 through 3, wherein the functional material is used for applications based on the properties of the noble metal nanotube(s).

8. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as a catalyst for fuel cell, automobile exhaust, or the like.

9. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as an electrode for electrolysis or the like.

10. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as a sensor or a shape-memory sensor for detecting temperature, pressure, humidity, dew condensation, flow rate, wind velocity, light, gas, oxygen concentration or displacement.

11. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as paste.

12. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as an electric wiring material, an electrical resistive material, or a capacitor.

13. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as permanent magnet.

14. A functional material as claimed in claim 7, wherein the functional material is mainly used for application as a component of a microreactor.

15. A functional material as claimed in claim 7, wherein the functional material is mainly used for

application as a substance-storing material.